

WHAT IS CLAIMED IS:

1. A combined semiconductor apparatus comprising:
a substrate;
a first thin semiconductor film disposed on and bonded to the substrate, the first thin semiconductor film including at least one semiconductor device;
a second thin semiconductor film disposed on and bonded to the substrate, the second thin semiconductor film including an integrated circuit and a first terminal; and
a first individual interconnecting line formed as a thin film extending from the first thin semiconductor film over said surface of the substrate to the second thin semiconductor film, electrically connecting the semiconductor device in the first thin semiconductor film to the first terminal in the second thin semiconductor film.
2. The combined semiconductor apparatus of claim 1, further comprising a layer of conductive material disposed between the first thin semiconductor film and the substrate, the layer of conductive material being bonded formed on the substrate and the first thin semiconductor film being bonded to the layer of conductive material, whereby the first thin semiconductor film is bonded on the substrate.
3. The combined semiconductor apparatus of claim 2, wherein the layer of conductive material is a metal layer or a polysilicon layer.
4. The combined semiconductor apparatus of claim 1, wherein the substrate has glass, resin, a ceramic, metal, or a semiconductor as its principal material.
5. The combined semiconductor apparatus of claim 1,

further comprising a circuit pattern formed on the substrate, the circuit pattern comprising at least one of an interconnecting line, a resistor, and a capacitor.

6. The combined semiconductor apparatus of claim 5, further comprising a second individual interconnecting line formed as a thin film, wherein:

said second thin semiconductor film has a second terminal;

the circuit pattern formed on the substrate has a third terminal; and

the second individual interconnecting line extends from the second thin semiconductor film to the circuit pattern on the substrate, electrically interconnecting the second terminal with the third terminal.

7. The combined semiconductor apparatus of claim 6, wherein the second individual interconnecting line is formed by photolithography.

8. The combined semiconductor apparatus of claim 6, wherein the second individual interconnecting line comprises at least one of an Au layer, a Ti/Pt/Au multi-layer, an Au/Zn multi-layer, an AuGeNi/Au multi-layer, a Pd layer, a Pd/Au multi-layer, an Al layer, an Al/Ni multi-layer, a polysilicon layer, an ITO layer, and a ZnO layer.

9. The combined semiconductor apparatus of claim 1, wherein the first thin semiconductor film has amorphous silicon, monocrystalline silicon, polysilicon, a compound semiconductor, or an organic semiconductor as its principal material.

10. The combined semiconductor apparatus of claim 1,

wherein the first thin semiconductor film is an epitaxially grown compound semiconductor film.

11. The combined semiconductor apparatus of claim 10, wherein the first thin semiconductor film comprises, at least, one of $\text{Al}_x\text{Ga}_{1-x}\text{As}$ ($0 \leq x < 1$), $(\text{Al}_x\text{Ga}_{1-x})_y\text{In}_{1-y}\text{P}$ ($0 \leq x < 1$ and $0 \leq y < 1$), GaN, AlGaN, and InGaN.

12. The combined semiconductor apparatus of claim 1, wherein the semiconductor device in said first thin semiconductor film is one of a light-emitting device, a photodetector, a Hall element, and a piezoelectric device, and the integrated circuit in the second thin semiconductor film includes a driver circuit for driving the semiconductor device.

13. The combined semiconductor apparatus of claim 1, wherein the first thin semiconductor film includes a plurality of semiconductor devices disposed at regular intervals, said semiconductor device being one of the plurality of semiconductor devices.

14. The combined semiconductor apparatus of claim 1, wherein the first thin semiconductor film includes only one said semiconductor device.

15. The combined semiconductor apparatus of claim 1, wherein a plurality of first thin semiconductor films are bonded to said surface of the substrate, said first thin semiconductor film being one of the plurality of first thin semiconductor films.

16. The combined semiconductor apparatus of claim 1, wherein the second thin semiconductor film has

recrystallized silicon, monocrystalline silicon, polycrystalline silicon, a compound semiconductor, an organic semiconductor, or a polymer as its principal material.

17. The combined semiconductor apparatus of claim 1, wherein a plurality of first thin semiconductor films are bonded to said surface of the substrate, said first thin semiconductor film being one of the plurality of first thin semiconductor films, the plurality of first thin semiconductor films being disposed in a row array, the second thin semiconductor film having a length substantially equal to a length of the linear array.

18. The combined semiconductor apparatus of claim 1, wherein the first individual interconnecting line is formed by photolithography.

19. The combined semiconductor apparatus of claim 1, wherein the first individual interconnecting line comprises at least one of an Au layer, a Ti/Pt/Au multi-layer, an Au/Zn multi-layer, an AuGeNi/Au multi-layer, a Pd layer, a Pd/Au multi-layer, an Al layer, an Al/Ni multi-layer, a polysilicon layer, an ITO layer, and a ZnO layer.

20. The combined semiconductor apparatus of claim 1, wherein the first and second thin semiconductor films are less than or equal to ten micrometers thick.

21. The combined semiconductor apparatus of claim 1, wherein the first individual interconnecting line is less than two hundred micrometers long.

22. The combined semiconductor apparatus of claim 1,

wherein:

the thin semiconductor film includes a plurality of semiconductor devices disposed in a first array, said semiconductor device being one of the plurality of semiconductor devices;

the integrated circuit in the second thin semiconductor film includes a plurality of driving circuits disposed in a second array for driving the plurality of semiconductor devices;

the first array and the second array have substantially equal array pitches;

the driving circuits and the semiconductor devices are disposed in facing pairs; and

the combined semiconductor apparatus includes a plurality of first individual interconnecting lines electrically interconnecting the facing pairs of semiconductor devices and driving circuits, said first individual interconnecting line being one of the plurality of first individual interconnecting lines.

23. An optical print head including the combined semiconductor apparatus of claim 1.

24. The optical print head of claim 23, wherein the semiconductor device in the first thin semiconductor film in the combined semiconductor apparatus is a light-emitting element, the combined semiconductor apparatus including a plurality of such light-emitting elements, the optical print head further including:

a base for supporting the combined semiconductor apparatus;

a rod lens array for focusing the light emitted by the light-emitting elements in the combined semiconductor apparatus;

a holder for holding the rod lens array; and
at least one clamp for holding the base and the holder
together.

25. An image-forming apparatus comprising at least one
optical print head including the combined semiconductor
apparatus of claim 1.

26. The image-forming apparatus of claim 25, further
comprising:

a photosensitive drum selectively illuminated by the
optical printing head to form a latent electrostatic image.

27. The image-forming apparatus of claim 26, further
comprising:

a developing unit for supplying toner to develop the
latent electrostatic image on the photosensitive drum; and
a transfer roller for transferring the developed image
from the photosensitive drum to printing media.